Listing of Claims:

1-83 (canceled).

84. (Previously presented) A method of solid phase peptide synthesis for preparing a ligand presenting assembly (LPA) for presentation of at least two identical peptide sequences having between 4 and 20 amino acids and having free C-terminal groups comprising the steps of:

a) assembling a plurality of identical, fully side-chain protected peptide sequences on a single solid phase resin support to provide a compound having the following formula:

$$[H_2N\text{-}A\text{-}CO]_a\text{-}S \quad , \qquad \text{(Formula I)}$$

wherein S represents the solid phase resin support, A represents a peptide sequence having between 4 and 20 naturally occurring L-amino acid residues, and a is >= 2, and represents the number of fully side-chain protected peptide sequences on the resin support;

b) deprotecting any protected N-terminal amino groups while the peptide sequences are still attached to the resin support;

c) reacting the resulting compound having unprotected N-terminal amino groups in the peptide sequences with between 0.4 and 0.6 equivalents of an achiral dicarboxylic acid selected from the group consisting of: imino diacetic acid, 2-amino malonic acid, malonic acid, 3-amino glutaric acid and glutaric acid, being

Fmoc, Boc or Aloc-protected on the amino or imino group, if present, thus having the following formula:

$$R(COOH)_2 \ , \qquad \text{(Formula II)}$$

wherein R represents a $N(X)(CH_2\text{-})_2$, $NH(X)CH<$, $CH_2<$, $NH(X)CH(CH_2\text{-})_2$ or $CH_2(CH_2\text{-})_2$ group, and X represents an Fmoc, Boc or Aloc group, so that between 0.4 and 0.6 equivalents of said achiral dicarboxylic acid are added for every 1 equivalent of unprotected N-terminal amino group resulting in a compound with the following formula:

$$[H_2N\text{-}A\text{-}CO]_{a\text{-}b} > S$$
$$[HOOC\text{-}R\text{-}CO\text{-}HN\text{-}A\text{-}CO]_b, \qquad \text{(Formula III)}$$

wherein b is between about 0.4a and 0.6a;

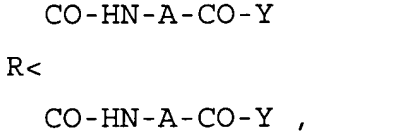
d) activating the product of step (c) (Formula III) so that the free carboxylic acid group reacts with the free N-terminal amino group; resulting in a compound of the following formula:

$$R< \begin{matrix} CO\text{-}HN\text{-}A\text{-}CO \\ CO\text{-}HN\text{-}A\text{-}CO \end{matrix} >S \ , \qquad \text{(Formula IV)}$$

and

e) optionally splitting of any N-terminal Fmoc-group, Boc-group or Aloc-group;

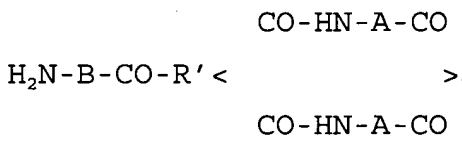
f) cleaving the product of step (e) from the resin support resulting in a LPA peptide sequence having the following formula:



(Formula V),

wherein, if N is present in R, X represents H, an Fmoc, Boc or Aloc group, and Y is OH or NH_2.

85. (Previously presented) A method according to claim 84 further comprising the steps of prior to step (f)
(e') splitting of any N-terminal Fmoc, Boc or Aloc group originating from the dicarboxylic acid used in step (c) and
(e'') continuing the solid phase synthesis so as to provide a compound of the following formula:



(Formula VI)

wherein B represents a peptide sequence, and R' represents a $N(CH_2\text{-})_2$, NHCH<, or $NHCH(CH_2\text{-})_2$ group.

86. (Previously presented) The method according to claim 84, wherein the achiral acid is imino diacetic acid.

87. (Currently amended) The method according to claim ~~84~~ 91, wherein the peptide sequences are derived from OspC protein of Borrelia burgdorferi.

88. (Currently amended) The method according to claim ~~84~~ 91 for preparing an LPA for presenting two identical C-terminal sequences Pro-Lys-Lys-Pro (Seq. ID 7) of OspC.

89. (Currently amended) The method according to claim ~~84~~ 91, wherein the peptide sequences are derived from the flagellum of Borrelia burgdorferi.

90. (Currently amended) The method according to claim ~~84~~ 91 for preparing an LPA selected from the group consisting of

[LPA-I]: $FmocN(CH_2CO\text{-}ProValValAlaGluSerProLysLysPro\text{-}OH)_2$ ($FmocN(CH_2CO\text{-}Seq.\ ID\ 1\text{-}OH)_2$)

[LPA-III]: $NH_2CH(CH_2CO\text{-}ProValValAlaGluSerProLysLysPro\text{-}OH)_2$ ($NH_2CH(CH_2CO\text{-}Seq.\ ID\ 1\text{-}OH)_2$

[LPA-VII]: $CH_2(CH2CO\text{-}\beta\text{-}Ala\text{-}\beta\text{-}AlaLysGluProAsnLysGlyValAsnProAspGluVal\beta\text{-}Ala)_2$ ($CH_2(CH_2CO\text{-}\beta\text{-}Ala\text{-}\beta\text{-}Ala\text{-}Seq.\ ID\ 4\text{-}\beta\text{-}Ala\text{-}OH)_2$)$_2$

[LPA-VIII]: $H_2C(CH_2CO\text{-}LysGluProAsnLysGlyValAsnProAspGluVal\beta Ala)_2COOH$ ($H_2C(CH_2CO\text{-}Seq.\ ID\ 4\text{-}\beta\text{-}Ala)_2COOH$),

[LPA-IX]: $Fmoc\text{-}NHCH(CH_2CO\text{-}AspArgValTyrIleHisProPheHisLeu\text{-}NH_2)_2$ ($Fmoc\text{-}NHCH(CH_2CO\text{-}Seq.\ ID\ 5\text{-}NH_2)_2$),

[LPA-X]: $Aloc\text{-}NHCH(CH_2CO\text{-}AspArgValTyrIleHisProPheHisLeu\text{-}NH_2)_2$ ($Aloc\text{-}NHCH(CH_2CO\text{-}Seq.\ ID\ 5\text{-}NH_2)_2$), and

91. (Previously presented) A method of solid phase peptide synthesis for preparing a ligand presenting assembly (LPA) for presentation of at least two identical peptide sequences from Borrelia burgdorferi having between 4 and 20 amino acids and having free C-terminal groups comprising the steps of:

a) assembling a plurality of identical, fully side-chain protected peptide sequences on a single solid phase resin support to provide a compound having the following formula:

$$[H_2N\text{-}A\text{-}CO]_a\text{-}S \quad , \qquad \text{(Formula I)}$$

wherein S represents the solid phase resin support, A represents a peptide sequence having between 4 and 20 naturally occurring L-amino acid residues, and a is >= 2, and represents the number of fully side-chain protected peptide sequences on the resin support;

b) deprotecting any protected N-terminal amino groups while the peptide sequences are still attached to the resin support;

c) reacting the resulting compound having unprotected N-terminal amino groups in the peptide sequences with between 0.4 and 0.6 equivalents of an achiral dicarboxylic acid selected from the group consisting of: imino diacetic acid, 2-amino malonic acid, malonic acid, 3-amino glutaric acid and glutaric acid, being Fmoc, Boc or Aloc-protected on the amino or imino group, if present, thus having the following formula:

$$R(COOH)_2 \ , \qquad \text{(Formula II)}$$

wherein R represents a $N(X)(CH_2-)_2$, $NH(X)CH<$, $CH_2<$, $NH(X)CH(CH_2-)_2$ or $CH_2(CH_2-)_2$ group, and X represents an Fmoc, Boc or Aloc group, so that between 0.4 and 0.6 equivalents of said achiral dicarboxylic acid are added for every 1 equivalent of unprotected N-terminal amino group resulting in a compound with the following formula:

$$[H_2N\text{-}A\text{-}CO]_{a\text{-}b} > S$$
$$[HOOC\text{-}R\text{-}CO\text{-}HN\text{-}A\text{-}CO]_b, \quad \text{(Formula III)}$$

wherein b is between about 0.4a and 0.6a;

d) activating the product of step (c) (Formula III) so that the free carboxylic acid group reacts with the free N-terminal amino group; resulting in a compound of the following formula:

$$\begin{matrix} CO\text{-}HN\text{-}A\text{-}CO \\ R< \qquad\qquad >S \\ CO\text{-}HN\text{-}A\text{-}CO \end{matrix} , \quad \text{(Formula IV)}$$

and

e) optionally splitting of any N-terminal Fmoc-group, Boc-group or Aloc-group;

f) cleaving the product of step (e) from the resin support resulting in a LPA peptide sequence having the following formula:

$$\begin{matrix} CO\text{-}HN\text{-}A\text{-}CO\text{-}Y \\ R< \\ CO\text{-}HN\text{-}A\text{-}CO\text{-}Y \end{matrix} , \quad \text{(Formula V)},$$

wherein, if N is present in R, X represents H, an Fmoc, Boc or Aloc group, and Y is OH or NH_2.

92. (Previously presented) A method of solid phase peptide synthesis for preparing a ligand presenting assembly (LPA) for presentation of at least two identical peptide sequences derived from OspC protein of Borrelia burgdorferi having between 4 and 20 amino acids and having free C-terminal groups comprising the steps of:

a) assembling a plurality of identical, fully side-chain protected peptide sequences on a single solid phase resin support to provide a compound having the following formula:

$$[H_2N\text{-}A\text{-}CO]_a\text{-}S \quad , \qquad \text{(Formula I)}$$

wherein S represents the solid phase resin support, A represents a peptide sequence having between 4 and 20 naturally occurring L-amino acid residues, and a is >= 2, and represents the number of fully side-chain protected peptide sequences on the resin support;

b) deprotecting any protected N-terminal amino groups while the peptide sequences are still attached to the resin support;

c) reacting the resulting compound having unprotected N-terminal amino groups in the peptide sequences with between 0.4 and 0.6 equivalents of an achiral dicarboxylic acid selected from the group consisting of: imino diacetic acid, 2-amino malonic acid, malonic acid, 3-amino glutaric acid and glutaric acid, being

Fmoc, Boc or Aloc-protected on the amino or imino group, if present, thus having the following formula:

$$R(COOH)_2 \ , \qquad \text{(Formula II)}$$

wherein R represents a $N(X)(CH_2\text{-})_2$, $NH(X)CH<$, $CH_2<$, $NH(X)CH(CH_2\text{-})_2$ or $CH_2(CH_2\text{-})_2$ group, and X represents an Fmoc, Boc or Aloc group, so that between 0.4 and 0.6 equivalents of said achiral dicarboxylic acid are added for every 1 equivalent of unprotected N-terminal amino group resulting in a compound with the following formula:

$$[H_2N\text{-}A\text{-}CO]_{a\text{-}b} > S$$
$$[HOOC\text{-}R\text{-}CO\text{-}HN\text{-}A\text{-}CO]_b, \qquad \text{(Formula III)}$$

wherein b is between about 0.4a and 0.6a;

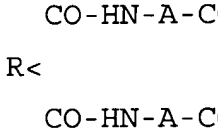
d) activating the product of step (c) (Formula III) so that the free carboxylic acid group reacts with the free N-terminal amino group; resulting in a compound of the following formula:

$$\begin{matrix} CO\text{-}HN\text{-}A\text{-}CO \\ R< \qquad\quad >S \\ CO\text{-}HN\text{-}A\text{-}CO \end{matrix} \ , \qquad \text{(Formula IV)}$$

and

e) optionally splitting of any N-terminal Fmoc-group, Boc-group or Aloc-group;

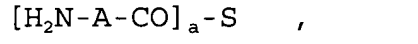
f) cleaving the product of step (e) from the resin support resulting in a LPA peptide sequence having the following formula:



wherein, if N is present in R, X represents H, an Fmoc, Boc or Aloc group, and Y is OH or NH_2.

93. (Previously presented) A method of solid phase peptide synthesis for preparing a ligand presenting assembly (LPA) for presentation of at least two identical peptide sequences from the flagellum of Borrelia burgdorferi having between 4 and 20 amino acids and having free C-terminal groups comprising the steps of:

a) assembling a plurality of identical, fully side-chain protected peptide sequences on a single solid phase resin support to provide a compound having the following formula:



wherein S represents the solid phase resin support, A represents a peptide sequence having between 4 and 20 naturally occurring L-amino acid residues, and a is >= 2, and represents the number of fully side-chain protected peptide sequences on the resin support;

b) deprotecting any protected N-terminal amino groups while the peptide sequences are still attached to the resin support;

c) reacting the resulting compound having unprotected N-terminal amino groups in the peptide sequences with between 0.4 and 0.6 equivalents of an achiral dicarboxylic acid selected from the group consisting of: imino diacetic acid, 2-amino malonic acid, malonic acid, 3-amino glutaric acid and glutaric acid, being Fmoc, Boc or Aloc-protected on the amino or imino group, if present, thus having the following formula:

$$R(COOH)_2 \ , \qquad \text{(Formula II)}$$

wherein R represents a $N(X)(CH_2\text{-})_2$, $NH(X)CH<$, $CH_2<$, $NH(X)CH(CH_2\text{-})_2$ or $CH_2(CH_2\text{-})_2$ group, and X represents an Fmoc, Boc or Aloc group, so that between 0.4 and 0.6 equivalents of said achiral dicarboxylic acid are added for every 1 equivalent of unprotected N-terminal amino group resulting in a compound with the following formula:

$$[H_2N\text{-}A\text{-}CO]_{a\text{-}b} > S [HOOC\text{-}R\text{-}CO\text{-}HN\text{-}A\text{-}CO]_b, \qquad \text{(Formula III)}$$

wherein b is between about 0.4a and 0.6a;

d) activating the product of step (c) (Formula III) so that the free carboxylic acid group reacts with the free N-terminal amino group; resulting in a compound of the following formula:

$$\begin{matrix} & CO\text{-}HN\text{-}A\text{-}CO & \\ R< & & >S \\ & CO\text{-}HN\text{-}A\text{-}CO & \end{matrix} \ , \qquad \text{(Formula IV)}$$

and

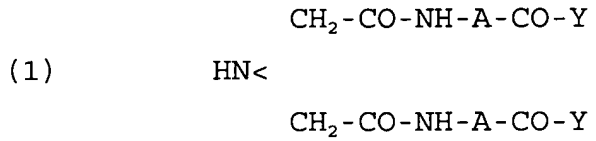
e) optionally splitting of any N-terminal Fmoc-group, Boc-group or Aloc-group;

f) cleaving the product of step (e) from the resin support resulting in a LPA peptide sequence having the following formula:

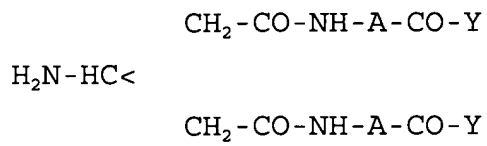
(Formula V),

wherein, if N is present in R, X represents H, an Fmoc, Boc or Aloc group, and Y is OH or NH_2.

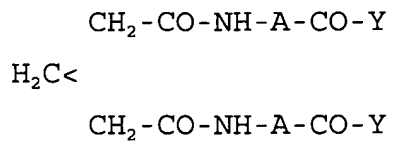
94. (Withdrawn) A ligand presenting assembly (LPA) having a formula selected from the group consisting of



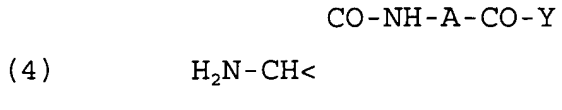
(1)



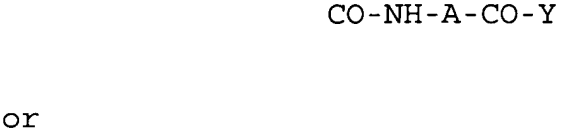
(2)



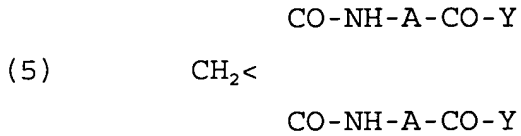
(3)



(4)



or



(5)

obtained by the method of claim 84, wherein A represents a peptide sequence having between 4 and 20 naturally occurring amino acid residues, and wherein Y represents OH or NH_2.

95. (Withdrawn) The method according to claim 85 for preparing an LPA selected from the group consisting of

[LPA-IV]: H-Lys-NHCH(CH_2CO-ProValValAlaGluSerProLysLysPro-OH)$_2$ (H-Lys-HNCH(CH2CO-Seq. ID 1-OH)$_2$

[LPA-XI]: Fmoc-AspProThrGlnAsnIleProProGly-NHCH(CH_2CO-AspArgValTyrlleHisProPheHisLeu-NH_2)$_2$ (Fmoc-Seq. ID 6-NHCH(CH_2CO-Seq. ID 5-NH_2)$_2$).